Claims

1. Metal-ceramic high temperature superconductor composite comprising a ceramic ht superconductor (1) bonded to a metal support (2) by a heat conductive bonding agent (3) wherein in the ceramic ht superconductor (1) at least one through hole (5) is provided being in communication to the bonding agent (6) at the interface between the metal support (2) and the ceramic ht superconductor (1), wherein further bonding agent (6) is provided in the at least one through hole (5) and wherein the bonding agent (6) at the interface and the bonding agent (6) in the at least one through hole (5) are in contact with each other.

2. Metal-ceramic ht superconductor composite according to claim 1,
wherein
the at least one through hole (5) has a conical shape with the diameter decreasing toward the metal support (4).

3. Metal-ceramic ht superconductor composite according to claim 1,
wherein
the bonding between the superconductor (1) and the metal support (4) is selected from a group consisting of a solder bonding and a bonding by an adhesive system.

4. Metal-ceramic ht superconductor composite according to claim 1
wherein
the superconductor is a $REBa_2Cu_3O$ type superconductor with RE being Rare Earth Metal selected from Y, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb.

5. Metal-ceramic ht superconductor composite according to claim 1,

wherein

the bonding between superconductor (1) and the metal support (4) is a solder bonding and wherein the bottom surface of the superconductor (1) adjacent to the metal support (4) and/or the inner surface of the wall of the trough holes (5) are at least partially metalized.

6. Metal-ceramic ht superconductor composite according to claim 1,

wherein

the superconductor (1) is of $REBa_2Cu_3O$ type having a burnt in silver layer at its bottom surface and/or a burnt in silver layer at the inner surface of the wall of the through holes (5).

7. Metal ceramic ht superconductor composite according to claim 1,

wherein

at least one hole is provided in the surface of the metal support (2) facing the superconductor (1).

8. Metal ceramic ht superconductor composite according to claim 1,

wherein

at least one pin is provided on the surface of the metal support (2) projecting into a through hole (5).

9. Method for bonding a ceramic ht superconductor to a metal support wherein the ceramic ht superconductor (1) is bonded to a metal support (4), wherein the ceramic ht superconductor (1) is bonded to the metal support (4) by a heat conductive bonding agent (6), filling heat conductive bonding agent (6) into at least one through hole (5) provided in the ceramic ht superconductor (1), said bonding agent (6) at the interface between the metal support (4)

and the ceramic ht superconductor and the bonding agent (6) within the at least one through hole (5) being in contact with each other.

10. Method according to claim 9,
wherein
the at least one through hole (5) has a conical shape with a diameter decreasing towards the support (4).

11. Method according to claim 9 or claim 10,
wherein
the bonding of the superconductor (1) to the metal support (4) is carried out by soldering.

12. Method according to claim 9,
wherein
the bonding of the superconductor (1) to the metal support (4) is carried out by an adhesive system.

13. Method according to claim 9
wherein
the bottom surface of the superconductor (1) and/or the inner surface of the wall of the at least one trough hole (5) are at least partially metalized by applying a metal on the surface.

14. Method according to claim 13,
wherein
the metalization is carried out by forming a burnt in metal layer by applying metal on the surface to be metalized and subjecting the surface to heat treatment.

15. Method according to claim 9 **wherein** the superconductor (1) is of $REBa_2Cu_3O$ type with RE being Rare Earth Metal selected from the group consisting of Y, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm and Yb.

16 Use of a metal ceramic ht superconductor composite according to any of the claims 1 to 8 for flywheels, electric motors and *bearing housing.*